

5 What is claimed is:

1. A composite papermaking fabric having an upper support fabric including upper warp and weft yarns and a lower contact fabric including lower warp and weft yarns, said upper fabric being woven in a first weave pattern forming a support surface and said lower fabric being woven in a broken twill weave pattern forming a contact surface, said composite fabric including paired binder yarns weaving in alternating sequences with said upper fabric in said first weave pattern and in said lower fabric in said broken twill weave pattern binding said upper and lower fabrics together:

10 said contact surface including a plurality of at least paired cross-machine direction yarns forming a plurality of floats passing outwardly of a plurality of adjacent machine direction yarns across the broken twill weave pattern, certain of said 15 at least paired cross-machine direction yarn floats include at least one of said lower weft yarns and one of said binder yarns whereby;

20 in said paired floats formed by said at least one of said lower weft yarns and one of said binder yarns, said float formed by said one binder yarn is shielded along its entire length by said float formed by said one lower weft yarn.

2. The composite papermaking fabric of claim 1 wherein said paired cross-machine direction floats pass under three adjacent machine direction yarns

3. The composite papermaking fabric of claim 1 wherein said certain of said paired floats formed across said broken twill weave pattern includes at least one float 25 formed by each of said paired binder yarns.

4. The composite papermaking fabric of claim 1 wherein said lower weft

5 yarns are larger in diameter than said binder yarns.

5. The composite papermaking fabric of claim 1 wherein said at least one lower weft yarn comprises two lower weft yarns arranged on opposing sides of said binder yarn floats.

6. The composite papermaking fabric of claim 1 wherein certain of said at 10 least paired cross-machine direction floats pass under five adjacent machine direction yarns.

7. The composite papermaking fabric of claim 1 wherein said broken twill weave pattern provides that each said binder yarn of said pair of binder yarns form at least one float of said plurality of paired floats across the width of said broken twill 15 weave pattern.

8. The composite papermaking fabric of claim 1 wherein certain ones of said paired cross-machine floats comprise adjacent ones of said lower weft yarns.

9. The composite papermaking fabric of claim 1 wherein said lower warp and weft yarns are of a larger diameter than said upper warp and weft yarns.

20 10. The composite papermaking fabric of claim 9 wherein said binder yarns and said upper warp and weft yarns are of equal diameter.

11. The composite papermaking fabric of claim 1 wherein said upper warp and weft yarns, said lower warp and weft yarns and said binder yarns are formed of one of polyester and nylon yarns.

25 12. The composite papermaking fabric of claim 1 wherein each said lower fabric weft yarn forms at least a portion of said plurality of paired cross-machine

5 direction floats per repeat of said broken twill weave pattern.

13. The composite papermaking fabric of claim 1 wherein said cross-machine
yarns forming successive of said plurality of paired floats pass outwardly of different
numbers of said machine direction yarns forming said plurality of paired floats of
different lengths across said broken twill weave pattern.

10 14. The composite papermaking fabric of claim 1 wherein each binder yarn of
said binder yarn pair weave with equal numbers of said upper and lower warp yarns
across said weave pattern.

15 15. A composite papermaking fabric woven in a 40 pick repeating weave
pattern having an upper support fabric including upper warp and weft yarns and a lower
contact fabric including lower warp and weft yarns, said weave pattern weaves said
upper fabric in a plain weave forming a support surface and said lower fabric in a
broken twill weave forming a contact surface, said composite fabric including paired
binder yarns weaving in alternating sequences with said upper fabric in said plain
weave and in said lower fabric in said broken twill weave binding said upper and lower
20 fabrics together:

25 said contact fabric including a plurality of paired cross-machine
direction yarns forming floats passing outwardly of a plurality of adjacent of said lower
warp yarns across the weave pattern, certain of said plurality of paired cross-machine
direction yarn floats include first ones of said binder yarn pairs and at least one of said
lower weft yarns and other ones of said plurality of paired cross-machine direction yarn
floats include a second of said binder yarns and at least one of said lower weft yarns;

5 whereby,

in said paired floats formed by said lower weft yarns and said binder yarns, said binder yarn floats are shielded along its entire length by said floats formed by said lower weft yarns.

16. A composite papermaking fabric woven in a 70 pick repeating weave pattern having an upper support fabric including upper warp and weft yarns and a lower contact fabric including lower warp and weft yarns, said weave pattern weaves said upper fabric in a plain weave forming a support surface and said lower fabric in a broken twill weave forming a contact surface, said composite fabric including paired binder yarns weaving in alternating sequences with said upper fabric in said plain weave and in said lower fabric in said broken twill weave binding said upper and lower fabrics together:

20 said contact surface including a plurality of multi-yarn cross-machine direction floats formed by three adjacent cross-machine direction yarns passing outwardly of a plurality of adjacent machine direction yarns across the broken twill weave pattern, the intermediate of said three cross-machine direction yarn floats comprises one of said pair of binder yarns and the other of said three adjacent cross-machine direction yarns comprises said lower weft yarns, whereby;

25 said binder yarn floats are shielded along their entire length between said lower weft yarn floats.

17. The composite papermaking fabric of claim 16 wherein said cross-machine direction floats are of different lengths across the weave pattern.

5 18. The composite papermaking fabric of claim 16 wherein said cross-machine direction floats are of equal lengths across said weave pattern.

19. A composite papermaking fabric woven in a 70 pick repeating weave pattern having an upper support fabric including upper warp and weft yarns and a lower contact fabric including lower warp and weft yarns, said weave pattern weaves said
10 upper fabric in plain weave forming a support surface and said weave pattern weaves said lower fabric in a broken twill weave forming a contact surface, said composite fabric includes paired binder yarns weaving in alternating sequences with said upper fabric in said plain weave and in said lower fabric in said broken twill weave binding said upper and lower fabrics together:

15 said contact surface includes a plurality of multi-yarn cross-machine direction floats formed by three adjacent cross-machine direction yarns passing outwardly of a plurality of adjacent machine direction yarns across the broken twill weave pattern, the intermediate of said three cross-machine direction yarn floats comprises one of said pair of binder yarns and the outer of said three cross-machine
20 direction yarn floats comprises said lower weft yarns; whereby,

 said binder yarn floats are shielded on each side along their entire length between said lower weft yarn floats.

20. The composite papermaking fabric of claim 19 wherein said cross-machine direction floats are of different lengths across the weave pattern.

25 21. The composite papermaking fabric of claim 19 wherein said cross-machine direction floats are of equal length across said weave pattern.